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SAFETY FEATURES FOR ALTERNATING CURRENT GROUND POWER UNITS FOR AIRCRAFT-SERVICING

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Indian Standard

SAFETY FEATURES FOR ALTERNATING CURRENT GROUND POWER UNITS FOR AIRCRAFT-SERVICING

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 31 January 1978, after the draft finalized by the Aircraft Electrical Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 Alternating current ground power units intended for use with aircrafts, which are subject to civil or military airworthiness requirements of India shall be subject to inspection and any directives issued from time to time by such statutory authorities.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard lays down the safety features for alternating current ground power units for aircraft-servicing and pre-flight preparation.

2. SAFETY FEATURES

2.0 General — The ground power unit shall be robust in construction and capable of withstanding mechanical shocks and hard wear in use. Materials/components used shall be capable of withstanding continuous exposure to the extremes of temperature, humidity, sun, snow, solar-radiation, noise and exhaust of aircraft, etc, to which the unit is likely to be subjected in the course of its service and operation. Components of the unit shall meet the dimensional and other requirements of the relevant Indian Standards. All contacts in the unit shall be detachable and capable of being replaced easily.

*Rules for rounding off numerical values (*revised*).

2.1 Phase Sequence — Clear indications of phase sequence (in the case of multiphase supply) as given in IS : 7854-1975* shall be permanently marked on the ground supply sockets and plugs, adjacent to the terminals. The markings shall be recessed.

2.2 Power/Voltage — The ground supply unit shall have adequate power rating for all essential requirements for aircraft-servicing and pre-flight preparation.

2.3 Voltage Control — The ground power units shall be capable of working continuously to develop the rated voltage within standard tolerance permissible for aircraft busbars, under all environmental conditions mentioned in 2.0. The voltage of the aircraft attachment terminals at the end of voltage servicing loads shall be maintained within a value of ± 2.5 percent of the nominal value.

2.4 Frequency Control — The frequency shall be maintained between 380 and 420 Hz.

2.5 Parallel Operation — The ground supply generator, where necessary shall be capable of being paralleled with the main aircraft generating system to enable the engines to be started and the aircraft generators to come on line without any break in the continuity of supply.

2.6 Overvoltage Protection — A protective device shall be incorporated in the unit to automatically cut-off the main supply if an overvoltage exceeding 115 percent of the normal busbar maximum voltage occurs at any time. There shall also be no fortuitous operation of the device at voltages below this figure.

2.7 Under Voltage Protection — Means shall be provided to prevent inadvertant closure of the main switch until the ground generator voltage has attained at least 90 percent of the minimum permissible busbar voltage.

2.8 Reverse Current Protection — Means shall be provided to safeguard against the flow of reverse current from the aircraft to the unit and there shall be no possibility of the generator motoring the prime-mover under any circumstances or of the ground supply generator being re-energized by reversed current or excess voltage.

2.9 Emergency Safety Trip — The ground power unit shall be provided with a prominently located tripping device (coloured red for easy identification and within easy reach) to enable the operator to instantaneously switch-off the main supply in the event of an emergency.

*Specification for voltages and frequency for aircraft electrical systems.

The main switch and tripping device shall be designed in such a manner that an operator cannot inadvertently override the safety features.

2.10 Anti-arcing Protection — Means shall be provided to ensure that the main supply switch cannot be closed until the connection of the ground supply unit to the aircraft has been made and preferably that, upon removal, the switch shall open before the main contacts are disconnected.

2.11 Panel Indication — Suitable instruments like voltmeters, ammeters, frequency meters, synchroscope, etc, of first grade accuracy shall be provided on the panel of the ground power unit. It shall be ensured that their readings are clearly visible at all times of the day and night (for example, through provision of suitable panel-lighting lamps). A flashing light at the top shall indicate whenever the unit is 'ON'. Two parking lights one each at the front and rear of the unit shall also be provided.

2.12 Earthing — The chassis of the ground power unit shall be effectively grounded through suitable means, for example, through one or more non-ferrous earthing chains.

2.13 Ground Supply Socket — The ground power unit sockets for aircraft plugs shall comply with IS : 7915-1976*.

2.13.1 They shall be robust in construction and capable of withstanding heavy mechanical shocks and hard wear and tear in use. The materials shall be resistant to the action of aviation fuels, lubricating oils, hydraulic fluids, cleaning fluids, humidity, ice, sun, snow, solar-radiation, etc.

2.13.2 The manufacturer shall declare the maximum and minimum temperatures which the sockets can withstand without damage or deterioration of the seal. This range shall not be less than -20° to $+90^{\circ}$.

2.14 Fire Prevention — All units using internal combustion engines shall incorporate an efficient spark arrester in the engine exhaust system. All ground supply units shall be provided with a fire-extinguisher adequate to deal with any fire supported by any breakage in the fuel pipe line of the unit.

*Dimensions for connections for aircraft ground electrical supplies.

3. DATA

3.1 The following data shall be clearly displayed on the unit:

- a) Terminal voltage or voltages and frequency,
- b) Continuous rating of the unit,
- c) Temperature range in which the unit can be safely operated continuously,
- d) Permissible one minute peak-output in amperes and volts,
- e) Reference to this Indian Standard, and
- f) Safety precautions.